भारतीय मानक
Indian Standard

IS 14544 : 2022

सीधे संचकित पॉलिमरिक तले के साथ चमड़े के सुरक्षा एवं संगरक्षी जूते — विशिष्टि

(पहला पुनरीक्षण)

Leather Safety and Protective Footwear with Direct Moulded Polymeric Sole — Specification

(First Revision)

ICS 61.060

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Footwear Sectional Committee, CHD 19

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Footwear Sectional Committee had been approved by the Chemical Division Council.

IS 14544 was published in 1998. This standard prescribed performance specifications for leather safety boots and shoes with direct moulded polyvinyl chloride (PVC) soles used in the industry and with general purpose resistance to oils and chemicals. Leather safety footwear with direct moulded rubber soles are covered in IS 11226.

In this first revision of the standard, the following changes have been made:

a) Material for sole expanded to cover all polymers;
b) Classification of footwear as per IS 15298 series of standards;
c) Terminology has been revised to align with IS 15298 series of standards;
d) The scope has been expanded to include protective footwear;
e) Type and varieties revised;
f) Chemical tests included; and
g) Sampling clause revised.

Synthetic soling material is no longer restricted to PVC with application of other polymeric materials for wider application. Safety and protective boots and shoes with direct moulded polymeric soles may be used by various industries including oil fields for providing safety to the workers engaged therein. Such footwear with direct moulded soles are manufactured, as the name indicates, by the direct moulding process. When the moulding process is over and the footwear is taken out from the machine, the solidified sole material adheres firmly to the leather upper of the footwear.

It may be noted that polymeric sole can be oil and chemical resistant, however, leather upper can only provide limited resistance to oil and chemicals. Hence, this footwear may be used for general protection where the workers are occasionally exposed to oil and chemicals or the contact of oils and chemicals is only till the sole level. It is advisable not to use such footwear where the working surface is clogged with oil or chemicals such that the leather upper is coming in contact with oils and chemicals.

Composition of Committee responsible for formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

LEATHER SAFETY AND PROTECTIVE FOOTWEAR WITH DIRECT MOULDED POLYMERIC SOLE — SPECIFICATION

(First Revision)

1 SCOPE

This standard prescribes requirements, methods of sampling and tests for leather safety and protective footwear having steel toe caps and with direct moulded polymeric soles for protection of users.

2 REFERENCES

The standards listed in Annex A contain provisions which through reference in this text, constitute provisions of this Indian Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this Indian Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 2050 and the following shall apply:

3.1 Compact Material — Polymeric material having density not less than 0.9 g/cm^3.

3.2 Polymeric Material — Polymeric materials are as defined in 3.4 of IS 15298 (Part 2) and as defined under harmonised system of nomenclature (HSN) as goods to fall under head of 39.

3.3 Protective Footwear — Footwear incorporating protective features to protect the wearer from injuries which could arise through accidents in the working sectors, for which the footwear was designed to give protection against impact when tested at an energy level of at least 100 J and compression at a load of at least 10 kN.

3.4 Protective Toecap — Footwear component built into the footwear designed to protect the toes of the wearer from impacts up to an energy level of at least 100 J and compression at a load of at least 10 kN.

3.5 Safety Footwear — Footwear incorporating protective features to protect the wearer from injuries which could arise through accidents in the working sectors, for which the footwear was designed to give protection against impact when tested at an energy level of at least 200 J and compression at a load of at least 15 kN.

3.6 Safety Toecap — Footwear component built into the footwear designed to protect the toes of the wearer from impacts up to an energy level of at least 200 J and compression at a load of at least 15 kN.

4 CLASSIFICATION

Footwear are to be classified as per **4** of IS 15298 (Part 2). This footwear falls under Class I.

5 TYPE AND VARIETY

5.1 The leather footwear with direct moulded polymeric sole shall be of the following two varieties depending on their use:

a) *Variety* 1 — For use as safety footwear; and
b) *Variety* 2 — For use as protective footwear.

5.2 The leather safety and protective footwear with direct moulded polymeric sole shall be of the following two types depending on their design:

a) *Type* 1 — Low shoes; and
b) *Type* 2 — Ankle boots.

6 PHYSICAL REQUIREMENTS

6.1 General

The footwear shall conform to the physical requirements given in Table 1.

Table 1 Physical Requirements for Footwear

(*Clause* 6.1)

Requirement		Subclause	Test on Finished Footwear/Material
Design	Design	6.2	X
	Fitting	6.3	X
	Height of Upper	6.4	X
Whole Footwear	Construction	6.5.1	I
	Ergonomic feature	6.5.2	X
	Upper-outsole bond strength	6.5.3	X
	Slip resistance	6.5.4	X
	Resistance to fuel oil	6.5.5	X
	Impact resistance of footwear	6.5.6	X
	Compression resistance of footwear	6.5.7	X
	Corrosion resistance	6.5.8	X
Upper	Material	6.6.2	I, X
	Tear strength	6.6.3	X/O
	Tensile strength	6.6.4	X/O
	Water vapour permeability and coefficient	6.6.5	X/O
Vamp and quarter lining	Material	6.7.1	I, X
	Tear strength	6.7.2	X/O
	Abrasion resistance	6.7.3	X/O
	Water vapour permeability and coefficient	6.7.4	X/O
Toecaps	Whole toecap	6.8	X/O
Insole	Material	6.9.1	I, X
	Thickness	6.9.2	X/O
	Abrasion resistance	6.9.3	X/O
	Water absorption and desorption	6.9.4	X/O
Insocks*	Thickness	6.10	X
	Material	6.10.1	I
	Abrasion resistance	6.10.2	X
	Water absorption and desorption	6.10.3	X
Stiffener	Stiffener	6.11	O
Tongue	Material	6.12	X
Closing thread	Properties	6.13	O
Outsole	Material	6.14.1	I, X
	Thickness, cleat area and cleat height	6.14.2, 6.14.3, 6.14.4	X
	Tear strength	6.14.5	X
	Abrasion resistance	6.14.6	X
	Flexing resistance	6.14.7	X
	Interlayer bond strength	6.14.8	X
Laces	Material	6.15.1	X
	Colour Fastness	6.15.2	X
	Abrasion Resistance	6.15.3	X
	Breaking load	6.15.4	X

*For footwear supplied with a removable insock, it should be made clear in the leaflet that testing was carried out with the insock in place. A warning shall be given that the footwear shall only be used with the insock in place and that the insock shall only be replaced by a comparable insock supplied by the original footwear manufacturer.

NOTE — Whenever possible, test pieces shall be taken from finished footwear.

X	Tests shall be carried out on finished footwear.
O	If it is not possible to obtain large enough test piece from finished footwear, then a sample of the material from which the component has been manufactured may be used and this should be noted in the test report. Manufacturer/supplier shall provide a certificate stating that the material sample is the same which has been used for footwear.
I	Identification by visual and tactile examination.

6.2 Design

The basic design of Type 1 and Type 2 footwear shall conform to design A and B, respectively, given in Fig. 3 of IS 15298 (Part 2). Any additional design feature or shape of the footwear shall be as agreed to between the purchaser and the manufacturer.

6.3 Size and Fitting

Sizes shall be in the range of 4 to 12 English size, conforming to G/H fittings prescribed in Table 1 of IS 1638 for adult size.

Fittings of the footwear shall be in conformity to Table 9 for men and Table 8 for women given in IS 1638 and suitably matching to manufacturer's last.

6.4 Height of Upper

The height of upper for Type 1 and Type 2 footwear shall conform to the requirement prescribed in Table 4 of IS 15298 (Part 2) for Variety 1; and it shall conform to the requirement prescribed in Table 4 of IS 15298 (Part 3) for Variety 2.

6.5 Physical Requirements of Whole Footwear

6.5.1 *Construction*

The footwear shall be manufactured by direct moulded process and shall have lining.

Toe of the footwear shall be reinforced with safety/protective toe cap so as to meet the impact resistance and compression resistance as per **6.5.6** and **6.5.7** of this standard.

The boots/shoes are to be provided with eyelets or D rings as agreed to between the purchaser and the manufacturer.

6.5.2 *Ergonomic Feature*

The boots shall be considered to satisfy the ergonomic requirements if the questionnaire given in **5.1** of IS 15298 (Part 1), is completed and all answers are positive.

However, if the boots meet the criteria specified in **8.4.1.4** of IS 15298 (Part 1), then question 4.3 of Table 2 of IS 15298 (Part 1) is not applicable.

6.5.3 *Upper – Outsole Bond Strength*

When the footwear is tested according to method given in **5.2** of IS 15298 (Part 1), the bond strength shall not be less than 4.0 N/mm, unless there is tearing of the sole, in which case the bond strength shall not be less than 3.0 N/mm.

6.5.4 *Slip Resistance*

When tested in accordance with **5.11** of IS 15298 (Part 1), the footwear shall conform to **5.3.5.2** or **5.3.5.3** of IS 15298 (Part 2).

6.5.5 *Resistance to Fuel Oil*

When the foowear tested in accordance with **8.6.1** of IS 15298 (Part 1), the increase in volume shall be not greater than 12 percent.

If, after testing in accordance with **8.6.1** of IS 15298 (Part 1), the test piece shrinks by more than 1 percent in volume or increases in hardness by more than 10 Shore A hardness units, a further test piece shall be taken and tested in accordance with the method described in **8.6.2** of IS 15298 (Part 1). The cut growth shall be not greater than 6 mm before 150 000 flex cycles.

6.5.6 *Impact Resistance*

6.5.6.1 When variety 1 footwear is tested in accordance with the method described in 5.4 of IS 15298 (Part 1), at an impact energy of (200 ± 4) J, the clearance under the toecap at the moment of impact shall be in accordance with Table 6 of IS 15298 (Part 2). In addition, the toecap shall not develop any cracks which go through the material, i.e. through which light can be seen.

6.5.6.2 When variety 2 footwear is tested in accordance with the method described in 5.4 of IS 15298 (Part 1), at an impact energy of (100 ± 2) J, the clearance under the toecap at the moment of impact shall be in accordance with Table 6 of IS 15298 (Part 3). In addition, the toecap shall not develop any cracks which go through the material, i.e. through which light can be seen.

6.5.7 *Compression Resistance*

6.5.7.1 When variety 1 footwear is tested in accordance with 5.5 of IS 15298 (Part 1), the clearance under the toecap at a compression load of (15 ± 0.1) kN shall be in accordance with Table 6 of IS 15298 (Part 2).

6.5.7.2 When variety 2 footwear is tested in accordance with 5.5 of IS 15298 (Part 1), the clearance under the toecap at a compression load of (10 ± 0.1) kN shall be in accordance with Table 6 of IS 15298 (Part 3).

6.5.8 *Resistance to Corrosion*

All metal accessories used in the footwear shall satisfy minimum scale of 4 when tested as per Method 2 of IS 17098.

6.6 Upper

6.6.1 *General*

For determining the area which shall be designated as upper and tested for requirements under this subclause, **5.4.1** of IS 15298 (Part 2) shall be referred.

6.6.2 *Material*

The upper for all types and varieties of this footwear shall be made from chrome tanned upper leather.

6.6.3 *Tear Strength*

When determined in accordance with **6.3** of IS 15298 (Part 1), the tear strength of the upper of class I footwear shall be minimum 120 N.

6.6.4 *Tensile Strength*

When determined in accordance with **6.4.1** of IS 15298 (Part 1), the tensile strength of upper shall be minimum 15 N/mm.

6.6.5 *Water Vapour Permeability and Coefficient*

When tested in accordance with **6.6** and **6.8** of IS 15298 (Part 1), the water vapour permeability shall not be less than 0.8 mg/(cm^2·h) and the water vapour coefficient shall be not less than 15 mg/cm^2.

6.7 Vamp and Quarter Lining

6.7.1 *Material*

The lining shall be made of chrome tan or combination tanned lining leather.

6.7.2 *Tear Strength*

When determined in accordance with **6.3** of IS 15298 (Part 1), the tear strength of the lining shall be minimum 30 N.

6.7.3 *Abrasion Resistance*

When tested in accordance with **6.12** of IS 15298 (Part 1), the lining shall not develop any holes before 25 600 cycles under dry conditions and before 12 800 cycles under wet conditions.

6.7.4 *Water Vapour Permeability and Coefficient*

When tested in accordance with **6.6** and **6.8** of IS 15298 (Part 1), the water vapour permeability shall not be less than 2.0 mg/(cm^2·h) and the water vapour coefficient shall be not less than 20 mg/cm^2.

6.8 Toe Caps

Toecaps shall be incorporated in the footwear in such a manner that they cannot be removed without damaging the footwear.

Footwear shall have a vamp lining or an element of the upper that serves as a lining. In addition, the toecaps shall have an edge covering extending from the back edge of the toecap to at least 5 mm beneath it and at least 10 mm in the opposite direction.

Toecaps for Variety 1 and Variety 2 footwear shall conform to the respective requirements given in IS 5852 (Part 1) or IS 5852 (Part 2) for safety and protective footwear. Scuff-resistant coverings for the toe region shall be not less than 1 mm in thickness.

6.9 Insole

6.9.1 *Material*

Insole shall be made of either leather board or cellulose board or strobel insole fabric. The material of the strobel insole fabric may be made from either cotton or polyester or nylon.

6.9.2 *Thickness*

When determined in accordance with **7.1** of IS 15298 (Part 1), the thickness of the insole shall not be less than 2.0 mm.

6.9.3 *Abrasion Resistance*

The abrasion resistance of insoles shall conform to the requirement prescribed in **5.7.4.1** of IS 15298 (Part 2).

When nsoles are tested in accordance with **7.3** of IS 15298 (Part 1), the abrasion damage shall not be more severe than that illustrated by the reference test pieces for the same family of materials before 400 cycles [*see* **7.3.6** of IS 15298 (Part 1)].

6.9.4 *Water Absorption and Desorption*

When tested in accordance with **7.2** of IS 15298 (Part 1), the water absorption shall not be less than 70 mg/cm^2 and the water desorption shall not be less than 80 percent of the water absorbed.

6.10 In socks

One pair of detachable in sock having minimum thickness of 3.0 mm at toe and 5.0 mm at heel with arch support shall be provided with each pair of footwear

6.10.1 *Material*

In socks shall be made out of either rubber or polymer or elastomer compound with drill or twill or suitable textile as top covering.

For mining operations, compact in socks shall be used.

6.10.2 *Abrasion Resistance*

When insocks are tested in accordance with **6.12** of IS 15298 (Part 1), the wearing surface shall not develop any holes before the 25 600 cycles under dry conditions and 12 800 cycles under wet conditions.

6.10.3 *Water Absorption and Desorption*

When tested in accordance with **7.2** of IS 15298 (Part 1), the water absorption shall not be less than 70 mg/cm^2 and the water desorption shall not be less than 80 percent of the water absorbed.

6.11 Stiffener

Stiffener shall conform to hard or very hard variety as prescribed in IS 7554.

6.12 Tongue

If the tongue of the footwear is made of the same material as upper it shall conform to all requirements prescribed in **6.6**.

If the tongue is made from a material different either in type or thickness from the upper, then it shall conform to the requirements prescribed in Table 16 of IS 15298 (Part 2) when tested in accordance with **6.3** of IS 15298 (Part 1).

6.13 Closing Thread

3 ply nylon or polyester thread with breaking load of 80 N when tested in a tensile testing machine with grip length of 50 cm and operating speed of 300 mm/min. The colour of the thread shall be as agreed to between the manufacturer and purchaser.

6.14 Outsole

6.14.1 *Material*

The outsole shall be made of mono-density or bi-density polymeric material. The outsole may be either cleated or non-cleated. Outsoles with a cleat height of less than 2.5 mm are regarded as non-cleated.

The outsole shall not be made of scraps of PVC including medical waste.

6.14.2 *Thickness*

The outsole may be composed of several layers. When measured in accordance with **8.1.2** of IS 15298 (Part 1), the sole thickness, d_1 and d_2, shall fulfil the requirements in Table 3.

Table 3 Requirements for Outsole Thickness and Cleat Height

(*Clause* 6.14.2)

Type of Outsole	Class I
Non-cleated outsole	$d_1 \geq 6$ mm
Cleated outsole	$d_1 \geq 4$ mm $d_2 \geq 2.5$ mm

6.14.3 *Cleated Area*

With the exception of the region under the flange of the toecap, at least the shaded area as shown in Fig. 38 of IS 15298 (Part 1) shall have cleats which are open to the side.

6.14.4 *Cleat Height*

When tested in accordance with **8.1** of IS 15298 (Part 1), the cleat height, d_2, is given in Table 3.

6.14.5 *Tear Strength*

When outsoles are tested in accordance with 8.2 of IS 15298 (Part 1), the tear strength shall not be less than 8 kN/m for a material with density higher than 0.9 g/cm^3; and 5 kN/m for a material with density lower or equal to 0.9 g/cm^3.

6.14.6 *Abrasion Resistance*

When outsoles are tested in accordance with **8.3** of IS 15298 (Part 1), the relative volume loss shall not be greater than 250 mm^3 for materials with density of 0.9 g/cm^3 or less, and not greater than 150 mm^3 for materials with a density greater than 0.9 g/cm^3.

6.14.7 *Flexing Resistance*

When outsoles are tested in accordance with **8.4** of IS 15298 (Part 1), the cut growth shall not be greater than 4 mm before 30 000 flex cycles.

Spontaneous cracks are accepted in the following circumstances:

a) Only the centre of the tread area shall be assessed for cracking, i.e. cracks under the toecap zone shall be ignored.
b) Superficial cracks up to 0.5 mm deep shall be ignored.
c) Soles shall be deemed to be satisfactory if cracks are not deeper than 1.5 mm, not longer than 4 mm and not more than five in number.

6.14.8 *Interlayer Bond Strength*

If the sole is made of bi-density polymer, the bond between the midsole and the outsole shall not be less than 4.0 N/mm, unless there is tearing of the sole, in which case the bond strength shall not be less than 3.0 N/mm, when tested according to method given in **5.2** of IS 15298 (Part 1).

6.15 Laces

6.15.1 *Material*

Nylon laces or polyester laces shall have a minimum length of 70mm for Type 1 footwear and 100 mm for Type 2 footwear. The colour of the laces shall be as agreed to between the purchaser and the manufacturer.

6.15.2 *Colour Fastness*

When the laces are tested for colour fastness to water as per IS/ISO 105-E01, the rating shall be minimum 4.

6.15.3 *Abrasion Resistance*

6.15.3.1 *Lace to lace*

Laces shall withstand minimum 5000 cycles without breaking when tested for lace to lace abrasion using Method 1 of ISO 22774.

6.15.3.2 *Lace to eyelet*

Laces shall withstand minimum 5 000 cycles without breaking when tested for lace to eyelet abrasion using Method 3 of ISO 22774.

6.15.4 *Breaking Load*

Minimum breaking load of laces shall be 400 N when tested as per the method given in IS 1969 (Part 1) or IS 1969 (Part 2). The minimum tag retention load shall be 140 N when tested as per the method given in Annex H of IS 15844.

7 CHEMICAL REQUIREMENTS

7.1 The boots shall be free from toxic and hazardous chemicals and shall meet the requirements specified in Table 1 of IS 17011.

7.2 When the PVC outsole is tested in accordance with IS 12240 (Part 4), the volatile content shall not be more than 2 percent.

8 ADDITIONAL REQUIREMENTS

Additional requirement given in the Table 4 may be incorporated depending on the risk to be encountered at work place. In such case the footwear shall conform to the appropriate additional requirement and corresponding marking, given in the Table 4.

Table 4 Additional Requirements for Footwear

(*Clause* 8)

Requirement		Subclause	Symbol
Whole Footwear	Antistatic footwear	8.1	A
	Conductive footwear	8.2	C
	Cold insulation of sole	8.3	CI
	Heat insulation of sole	8.4	HI

8.1 Antistatic Footwear

When tested in accordance with **5.10** of IS 15298 (Part 1), after conditioning in a dry and wet atmosphere, the electrical resistance shall not be less than 100 kΩ and shall not be greater than 1000 MΩ in each case.

8.2 Conductive Footwear

When measured in accordance with **5.10** of IS 15298 (Part 1), after conditioning in a dry atmosphere, the electrical resistance shall be not greater than 100 kΩ.

8.3 Cold insulation of Sole

When tested in accordance with **5.13** of IS 15298 (Part 1), the footwear shall satisfy the requirement given in **6.2.3.2** of IS 15298 (Part 2).

8.4 Heat insulation of Sole

When tested in accordance with **5.12** of IS 15298 (Part 1), the footwear shall satisfy the requirement given in **6.2.3.1** of IS 15298 (Part 4).

9 SAMPLING

9.1 Scale of Sampling

9.1.1 Samples shall be selected and examined from each lot for ascertaining the conformity of the footwear to the requirements of given specification.

9.1.2 For the purpose of formation of lots, footwear shall be considered to be different, if they differ in any of the ways enumerated below:

a) Method of preparation;
b) Type and material of components; and
c) Size, shape and design.

9.1.3 The number of footwear pairs to be selected from any lot shall depend upon the size of the lot and shall be in accordance with Col 1 and 2 of Table 5. Whenever the lot size is more than 20,000 pairs, the quantity above 20,000 pairs shall be treated as another lot and samples shall be drawn as per Col 2 of Table 5, and so on.

Table 5 Scale of Sampling and Permissible Number of Defectives for Tests on Whole Footwear

(*Clause* 9.1.3)

Sl No.	No. of Footwear Pairs in the Lot (N)	Sample Size (n)	Permissible No. of Defective pairs for Major Defects	Permissible No. of Defective pairs for Minor Defects	Samples Size for Physical and Destructive Tests (m)
(1)	(2)	(3)	(4)	(5)	(6)
i)	up to 50	8	0	0	3
ii)	51 to 90	13	0	1	3
iii)	91 to 150	20	0	1	3
iv)	151 to 280	32	1	1	5
v)	281 to 500	50	1	2	5
vi)	501 to 1200	80	1	3	5
vii)	1201 to 3200	125	2	5	8
viii)	3201 to 10000	200	3	7	8
ix)	10001 to 20000	300	5	10	10

9.2 Methods of Selecting Footwear

9.2.1 Footwear shall be chosen at random from the lot. In order to ensure the randomness of selection, a random number table may be used. For guidance to the use of random number table, IS 4905 may be referred.

9.2.2 In the absence of a random number table, the footwear pairs may be selected from the lot in the following manner: Starting from any footwear pair in the lot, the pairs shall be counted as 1, 2, 3, etc, up to r and so on, in one order. Every r^{th} pair thus counted shall be withdrawn to constitute the sample where r is the integral part of N/n (N and n being the lot size and sample size respectively). This procedure may be stopped as soon as the required number of pairs is obtained.

9.2.3 When the footwear pairs in the lot are packed in a number of cases, a suitable number of cases (not less than 30 percent of the total in the lot) shall be first chosen at random. From each of the cases so chosen, an approximately equal number of pairs shall be picked up from its different parts so as to obtain the required number of pairs.

9.2.3.1 For example, if a lot consists of 1200 pairs of footwear packed in 50 cases, each containing 24 pairs, not less than 15 cases shall be chosen. If it is decided to open 20 cases, then 4 pairs shall be picked in random from each of the 20 cases, so as to give a total of 80 pairs as specified against the lot of 1200 in Table 5.

9.3 Number of Tests and Criteria for Conformity

9.3.1 *Visual and Tactile Examination*

The lot shall be first subjected to detailed visual and tactile examination. The defects usually observed on such examination have been broadly divided into two classes, namely, major defects and minor defects. The list of major and minor defects is given below. It is not exhaustive but covers those which are commonly met with during inspection.

9.3.1.1 Major defects commonly observed during visual inspection of finished footwear:

a) Difference in shape, design and colour;
b) Incorrect size/wrong size packing/odd pairing;
c) Distortion of shape;
d) Faulty joining and adhesion of sole, insole and upper;
e) Insole cut short;
f) Under gauge or over gauge components;
g) Excessive pitting or air pocket or bulging of the sole or any other component;
h) The toe reinforcement omitted or not cemented properly to the vamp;
j) Missing or defective D rings/hooks or eyelets;
k) Crocked imitation stitches; and
m) Substandard lace.

9.3.1.2 Minor defects commonly observed during visual inspection of finished footwear:

a) Stains and dirt in lining and insole/insocks;
b) Stiffeners not centrally placed;
c) Slight variation in positioning of D rings/hooks or eyelets;
d) Illegible marking on the insole/insocks; and
e) Slight variation in height of quarter and leg.

9.3.1.3 *Inspection for major defects*

The sample size for this examination is given in col 2 of Table 5. All the selected footwear pairs shall be examined for major defects. Defective footwear under this clause shall be one which contains one or more of major defects and it may or may not show minor defects. A pair is termed defective if one or both of the constituent footwear are defective. The number of defective footwear pairs shall not exceed the permissible number given in col 3 of Table 5 for acceptance of the lot.

9.3.1.4 *Inspection for Minor Defects*

The lot which passes the test under **9.3.1.3** shall be subjected to scrutiny for minor defects. The sample size is the same as in **9.3.1.3**. These sample pairs may be drawn from among those found satisfactory under **9.3.1.3** along with the required number of fresh pairs to give the prescribed sample size. Under this clause defective footwear may contain one or more of minor defects but shall not show any major defect. A pair is termed defective if one or both of the constituent footwear are defective. The number of defective pairs found on this examination shall not exceed the permissible number given in col 4 of Table 5.

9.3.1.5 The lot shall be declared to conform to the requirements for visual and tactile characteristics if 9.3.1.3 and 9.3.1.4 are satisfied. If however, the number of defective pairs exceeds the permissible number, the lot shall be deemed as not conforming to the requirements for these characteristics.

9.3.1.6 In case of those lots which have been found unsatisfactory for visual and tactile characteristics, all footwear pairs in the lot may be inspected and defective ones replaced. In case of those lots which have been found satisfactory for visual and tactile characteristics, all defective pairs shall be replaced.

9.3.2 *Dimensional Characteristics*

The lot which has been found satisfactory as in **9.3.1** shall next be tested for dimensional characteristics without opening up of the footwear. The sample size for this examination is given in col 2 of Table 5. These pairs shall be taken at random and tested for dimensional characteristics. If the number of pairs failing to satisfy the requirements for these characteristics is less than or equal to the corresponding number given in col 3 of Table 5, the lot shall be declared to have met the requirements for these characteristics, otherwise not.

9.3.3 *Physical and Destructive Tests*

9.3.3.1 *Tests for physical requirements*

The lot found satisfactory for dimensional characteristics (*see* **9.3.2**) shall be next tested for physical characteristics given in Table 1. For this purpose the pairs shall be selected at random from the samples which have been tested and found satisfactory for **9.3.2**. The no. of pairs to be selected is prescribed in Col 5 of Table 5. These pairs shall be opened up and subjected to required physical tests. The lot shall be declared as satisfactory with respect to these characteristics if all the sample pairs pass the prescribed tests.

9.3.3.2 *Tests for chemical requirements*

The lot which has been found satisfactory as per **9.3.3.1** shall be finally tested for chemical properties of the components by opening up of the footwear. For this purpose, two pairs shall be drawn at random from those already tested and found satisfactory for **9.3.2**. These two pairs shall then be opened up and tested for chemical requirements of the components as specified in **7**. For chemical analysis, the test samples may be prepared by mixing the cuttings from both the units in a pair. The lot shall be declared to have satisfied the requirements for these characteristics if both the sample pairs are found satisfactory.

9.3.3.3 Sometimes it is not possible to carry out tests by taking component from the finished footwear. In those cases, the component sample has to be collected from the manufacturer/supplier. Col. 3 of Table 1 indicates whether the test can be carried out from the finished footwear or separate sample is needed from manufacturer.

9.4 The lot shall be deemed as conforming to the standard if it satisfies the requirements of the visual, tactile, dimensional, physical and chemical characteristics as given in 9.3.

10 MARKING

10.1 Each boot shall be permanently marked with the following:

a) Size;
b) Manufacturer’s name and brand;
c) Year and month of manufacture;
d) Shelf life, if PU is used (1 year from month of manufacture);
e) Number and year of the standard, based upon which the boots are produced; and
f) Any other statutory marking.

10.2 BIS Certification Marking

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standard Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

11 PACKING

11.1 Packing shall be as agreed to between the purchaser and the supplier.

11.2 The following information in English and any other language shall be provided with the footwear packaging:

a) Name and full address of manufacturer;
b) Details of customer care service provider;
c) Instruction for storage and maintenance;
d) Instructions for cleaning and drying;
e) Wherever applicable, declaration to be made stating footwear is not for use in fire hazard/explosion prone areas/hot contact/electric resistance purpose; and
f) The footwear is not a GREEN footwear and not bio-degradable.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS/ISO No.	*Title*
IS/ISO 105-E01 : 2010	Textiles — Tests for colour fastness: Part E01 Colour fastness to water
1638 : 1969	Sizes and fitting of footwear
1969 (Part 1) : 2018	Textiles — Tensile properties of fabrics — Determination of maximum force and elongation at maximum force: Part 1 Strip method
1969 (Part 2) : 2018	Textiles — Tensile properties of fabrics — Determination of maximum force and elongation at maximum force: Part 2 Grab method
2050 : 1991	Glossary of terms relating to footwear
4905 : 2015	Random sampling and randomization procedures (*first revision*)
5852 (Part 1) : 2019	Toe caps for protection of feet — Specification: Part 1 metallic toe caps (*fifth revision*)
(Part 2) : 2019	Part 2 Non-Metallic Toe Caps
7554 : 2009	Toe puff and counter stiffener — Specification (*first revision*)
17011 : 2018	Chemical requirements for footwear and footwear materials
12240 (Part 4) : 1988	Methods of test for polyvinyl chloride boots: Part 4 Determination of volatility
15298 (Part 1) : 2015	Personal protective equipment: Part 1 Test methods for footwear (*second revision*)
(Part 2) : 2016	Personal protective equipment: Part 2 Safety footwear
(Part 3) : 2019	Personal protective equipment: Part 3 Protective footwear
17098 : 2019	Footwear — Test methods for accessories: metallic accessories — Corrosion resistance
ISO 22774 : 2004	Footwear — Test methods for accessories: shoe laces — Abrasion resistance

ANNEX B

(*Foreword*)

COMMITTEE COMPOSITION

Footwear Sectional Committee, CHD 19

Organization	*Representative(s)*
In personal capacity (*Flat F1, Bhoopathy Apartment, 10, Ethiraj Street, Palipattu, Chennai – 600113*)	Dr B. N. Das (***Chairman***)
Ambuja Cements, Mumbai	Shri Piyush B. Jain
Arvind Footwear Pvt Ltd, Ahemdabad	Shri Dilip Borkar
Atharva Labs, Noida	Ms Aparna Parvatikar Shri V. B. Parvatikar (*Alternate*)
BASF Polyurethanes India Ltd, Mumbai	Shri Alok Goel Shri Jitender Kumar (*Alternate*)
Bihar Rubber Co Ltd, Ranchi	Shri Jayanta Kumar Lahiri
Border Security Force, New Delhi	Shri K. L. Shah Shri Prem Vishwas (*Alternate*)
Bureau of Police Research and Development, Delhi	Shri Jagir Chand
Central Footwear Training Institute, Agra	Shri Sanatan Sahoo Shri S. K. Bhatia (*Alternate*)
Central Institute for Mining and Fuel Research, Dhanbad	Dr J. K. Pandey
Central Leather Research Institute, Chennai	Dr R. Mohan Shri Sathya Raj (*Alternate*)
Central Reserve Police Force, Ministry of Home Affairs, New Delhi	Shri Randhir Kumar Jha Shri R. K. Thakur (*Alternate*)
Council for Footwear Leather and Accessories, Gurgaon	Executive Director Shri Rajeev Sharma (*Alternate*)
Dept. of Industrial Policy & Promotion, New Delhi	Shri Nand Lal
Directorate General of Mines Safety, Dhanbad	Director (MSE) Dy Director (MSE) (*Alternate*)
Dye General Aeronautical Quality Assurance (DGAQA), New Delhi	Shri Satyananda Swain Wing Cdr G. S. Ghatti (*Alternate*)
Directorate General of Quality Assurance, Kanpur	Shri S. Chakraborty Shri Sanjay Verma (*Alternate*)
Directorate General of Factory Advice Service & Labour Institute, Mumbai	Dr Brij Mohan Shrimati M. K. Mandre (*Alternate*)
Footwear Design and Development Institute, Noida	Shri Shailendar Saxena Shri Saroj Kumar Panda (*Alternate*)
Government e-Marketplace, New Delhi	Shri N. K. Malhotra Shri Akhilesh Kumar (*Alternate*)
In personal capacity (*19222, ATS Advantage, Indirapuram, Ghaziabad 201014*)	Shri Neeraj Garg
Indian Footwear Components Manufacturers' Association, Noida	Shri Mani Almal Ms Rashmi (*Alternate*)
Intertek India Pvt Ltd, Gurugram	Shrimati Rashmi Asthana

Organization	*Representative(s)*
Jasch Industries Ltd.	Shri Navneet Garg
Lancer Footwear India Pvt Ltd, New Delhi	Shri Saurabh Gupta
Liberty Shoes Ltd, (P U Division), Karnal	Shri Adesh Gupta Shri S. S. Lahiri (*Alternate*)
M B Rubber Private Limited, Ghaziabad	Shri Vipan Mehta Dr P. S. Bhattacharya (*Alternate*)
Mangla Plastics, Bahadurgarh	Shri J. Basak
Mayur Leather Products Ltd, Jaipur	Shri Shailender Ku Neogi Shri Akhilesh Poddar (*Alternate*)
Micro, Small and Medium Enterprises – Technology Development Centre, Meerut	Shri Aditya Prakash Sharma Shri Tularam Bharti (*Alternate*)
National Institute of Fashion Technology, Delhi	Dr E. Sivasakthi
Pinza Footwear, New Delhi	Shri Prem Mehani
Prolific Engineers, Noida	Shri G. P. Kedia
Steel Authority of India Ltd, Bhilai	Shri V. K. Agarwal Shri A. K. Saha (*Alternate*)
Top Lasts, Agra	Shri Deepak Manchanda Shri Anurag Sharma (*Alternate*)
XO Footwear, Delhi	Shri Nalin Gupta Manoj Kumar (*Alternate*)
BIS Directorate General	Shri A. K. Lal, Scientist 'E' and Head (CHD) [Representing Director General (*Ex-officio*)]

Member Secretary

Ms Preeti Prabha
Scientist 'C' (CHD), BIS

Bureau of Indian Standards

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